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ELECTRONIC SYSTEMS TECHNICIAN

Performance Tasks

Level One

MODULE 33101-04 – INTRODUCTION TO THE TRADE

Task Number	Item	Date(s)	Recorded By
1	Locate selected articles and/or sections in the NEC®.		
2	Fill out a time sheet.		
3	Fill out a job sheet.		

MODULE 33102-04 – CONSTRUCTION MATERIALS AND METHODS

Task Number	Item	Date(s)	Recorded By
1	Select the appropriate drill bits and bore openings in lumber, masonry, and metal.		
2	Cut plywood with a jig saw or reciprocating saw.		
3	Install plywood on a gypsum board wall.		

MODULE 33103-04 – PATHWAYS AND SPACES

Task Number	Item	Date(s)	Recorded By
1	Make a conduit-to-box connection.		
2	Select cable support hardware for various applications.		
3	Install a cut-in box in drywall and run inner duct from the box to the ceiling.		

MODULE 33104-04 – FASTENERS AND ANCHORS

Task Number	Item	Date(s)	Recorded By
1	Install selected threaded fasteners.		
2	Install blind rivets.		
3	Install selected screws.		
4	Install selected anchors.		
5	Install selected toggle bolts.		

MODULE 33105-04 – JOB-SITE SAFETY

Task Number	Item	Date(s)	Recorded By
1	Perform a hazard assessment of a job such as replacing the lights in your classroom.		
	• Discuss the work to be performed and the hazards involved.		
	• Locate the closest phone to the work site, and ensure that the local emergency telephone numbers are either posted at the phone or known by you and your partner(s).		
	• Plan an escape route from the location in the event of an accident.		
2	Verify that a system is de-energized.		
3	Test for voltage.		
4	Perform a lockout/tagout.		
5	Test a GFCI.		

MODULE 33106-04 – CRAFT-RELATED MATHEMATICS

Task Number	Item	Date(s)	Recorded By
1	Convert values in English system units to equivalent metric system values and vice versa.		
2	Express numbers as powers of ten.		
3	Calculate the powers and roots of numbers.		
4	Solve basic algebraic equations for an unknown.		
5	Recognize various geometric figures.		
6	Calculate unknown angles and side lengths of right t riangles using the Pythagorean theorem and trigonometry.		
7	Convert dimensions given in decimal feet to feet and inches and vice versa.		

MODULE 33107-04 – HAND BENDING OF CONDUIT

Task Number	Item	Date(s)	Recorded By
1	Given a piece of EMT, complete the following using a hand bender, hacksaw, and reaming tool. No couplings are allowed, and there should be no kinks in the pipe.		
	• Offset		
	• Saddle		
	• 90-degree stub-up		
	• Back-to-back		
2	Cut and ream EMT conduit.		
3	Cut and join PVC conduit.		

MODULE 33108-04 – LOW VOLTAGE CABLING

Task Number	Item	Date(s)	Recorded By
1	Use a wire gauge to select a specific wire size.		
2	In order to prevent excessive voltage drop, determine the correct gauge of wire for a specific wire length, voltage, and load.		
3	Identify various types of cable.		
4	Explain the meaning of cable markings, and identify the general applications for the cable.		
5	Safely use a fish tape or power blower/vacuum unit to install a pull line in a conduit.		
6	Safely use a telescoping pole to install a pull line in an open ceiling.		
7	Prepare conductor ends for pulling. Safely use a power tugger and/or a reel brake along with snubbing ropes, as required, to pull cable in vertical and/or horizontal pathways. Demonstrate the ability to finish cable pull with cable fastening, labeling, and proper slack.		
8	Safely drill holes and fish cables in existing construction.		

Level Two

MODULE 33201-05 – DC CIRCUITS

Task Number	Item	Date(s)	Recorded By
1	Use the formula for Ohm's law to calculate unknown values for current, resistance, and voltage.		
2	Given different resistors, identify the correct resistance value and tolerance using the color code.		
3	Draw basic voltmeter and ohmmeter circuits and explain how they operate.		
4	Use the power formula to calculate the amount of power used by a circuit.		
5	Use a variation of the power formula to calculate the maximum current a resistor can carry based on the resistor's value and power rating.		
6	Calculate the total resistance for selected series, parallel, and series-parallel circuits.		
7	Use Kirchhoff's current law to calculate the total and unknown currents in parallel and series-parallel circuits.		
8	Use Kirchhoff's voltage law to calculate voltage drops in parallel and series-parallel circuits.		

MODULE 33202-05 – AC CIRCUITS

Task Number	Item	Date(s)	Recorded By
1	Calculate peak and rms values from a given AC source.		
2	Build the following circuits:		
	• RL		
	• RC		
	• LC (resonant frequency)		
	• RLC		
3	Calculate the impedance and reactance in the following circuits:.		
	• RL		
	• RC		
	• LC (resonant frequency)		
	• RLC		
4	Using RLC, RL, RC, and LC circuits, calculate true, apparent, and reactive power. Also calculate the power factor.		
5	Calculate the voltage on the secondary side of a transformer.		

MODULE 33203-05 – SEMICONDUCTORS AND INTEGRATED CIRCUITS

Task Number	Item	Date(s)	Recorded By
1	Build a simple circuit using an LED and a diode.		
2	Identify a microprocessor and applicable pin numbers.		
3	Build a simple bridge rectifier circuit and view the results.		
4	Build a holding circuit using an SCR, an LED, and a pushbutton.		

MODULE 33204-05 – BASIC TEST EQUIPMENT

Task Number	Item	Date(s)	Recorded By
1	Measure AC/DC voltage and current using an analog meter.		
2	Measure AC/DC voltage and current using a digital multimeter.		
3	Perform a continuity test on a basic circuit to test for open shorts.		

MODULE 33205-05 – POWER QUALITY AND GROUNDING

Task Number	Item	Date(s)	Recorded By
1	Identify the primary components needed in a typical telecommunications low-voltage grounding system and state the purpose for each component.		
2	Identify the components needed in a typical building lightning protection system and state the purpose for each component.		
3	Given one or more situations involving poor power quality and the related cause, select the appropriate system protection and/or conditioning device used to correct the problem.		
4	Select the UPS for use in a specific location.		
5	Use a VOM/DMM and oscilloscope to test the DC output of a DC power supply.		
6	Properly use an ESD wrist strap and handle printed circuit boards using proper ESD prevention techniques.		
7	Measure the resistance of ground electrodes using the three-point (62%) method.		
8	Locate the cause of a ground fault.		

MODULE 33206-05 – INTRODUCTION TO ELECTRICAL BLUEPRINTS

Task Number	Item	Date(s)	Recorded By
1	Look for devices on blueprints and perform a take-off.		
2	Identify the type of infrastructure specification.		
3	Demonstrate the use of an architect's scale.		

MODULE 33207-05 – SWITCHING DEVICES AND TIMERS

Task Number	Item	Date(s)	Recorded By
1	Identify and select various types of switches for the specific applications.		
2	Select an electromechanical relay and build a holding circuit.		
3	Identify and select various types of timers for the specific applications.		
4	Build a simple circuit using a simple photocell or motion detector.		

MODULE 33208-05 – WIRE AND CABLE TERMINATIONS

Task Number	Item	Date(s)	Recorded By
1	Terminate the following connectors.		
	• Crimp		
	• BNC coaxial		
	• F-type coaxial		
	• Solder type		
	• Punchdown		
	• Modular		

MODULE 33209-05 – INTRODUCTION TO CODES AND STANDARDS

Task Number	Item	Date(s)	Recorded By
1	Use the *National Electrical Code*® (NEC®) to determine the specific requirements for a given telecommunications and/or life safety system application.		
2	Use the applicable ANSI/TIA/EIA standards to determine the specific requirements for a given telecommunications and/or life safety system application.		

MODULE 33210-05 – COMPUTER APPLICATIONS

Task Number	Item	Date(s)	Recorded By
1	Construct and use a null modem cable.		
2	Assemble the components of a personal computer system.		
3	Back up system configuration files.		
4	Install and use a basic computer application.		

MODULE 33211-05 – ADVANCED TEST EQUIPMENT

Task Number	Item	Date(s)	Recorded By
1	Use an oscilloscope to measure various waveforms.		
2	Use a signal generator to generate various waveforms.		
3	Use a frequency meter to determine the frequency of a specific circuit.		
4	Using a test or an inductive pickup set, identify the pair attached to the toner.		

Level Three

MODULE 33301-04 – CABLE SELECTION

Task Number	Item	Date(s)	Recorded By
1	In order to prevent excessive voltage drop, determine the correct gauge of wire for a specific wire length at a specific voltage and load.		
2	Identify various types of cable for specific applications.		
3	Explain the meaning of cable markings, and identify the general applications for various cables.		
4	Size cable conductors for a load using various load calculation charts.		

MODULE 33302-04 – BUSES AND NETWORKS

Task Number	Item	Date(s)	Recorded By
1	Identify devices on a network.		
2	Demonstrate various procedures for troubleshooting media access problems on a network.		
3	Set up a star network using a switched-hub and UTP cables, and interface a printer, server, and minimum of two workstations.		
4	Demonstrate the ability to use the World Wide Web or another source to retrieve information.		
5	Demonstrate various networking procedures, including the following:		
	• Connecting to different operating systems (Windows®/Macintosh®)		
	• Connecting the devices in a PLC-based control network		
	• Connecting multiple networks		
6	Demonstrate the use of modems or X.25 devices to set up a WAN network.		

MODULE 33303-04 – FIBER OPTICS

Task Number	Item	Date(s)	Recorded By
1	Draw a functional block diagram of a basic fiber-optic link.		
2	Identify at least three factors that could affect performance.		
3	Identify a connector system.		
4	Install a connector on a fiber-optic cable.		
5	Demonstrate a selected testing procedure for fiber-optic cable.		
6	Create a loss budget for a fiber-optic link.		

MODULE 33304-04 – VIDEO SYSTEMS

Task Number	Item	Date(s)	Recorded By
1	Terminate an HD-15 connector.		
2	Identify the components of a video system.		
3	Connect a video system.		
4	Calculate the bandwidth of a video system.		
5	Set up a video display, and verify proper operation by using color bars.		
6	Isolate a fault in a video system.		

MODULE 33305-04 – WIRELESS COMMUNICATION

Task Number	Item	Date(s)	Recorded By
1	Install and test one or more types of wireless communication systems:		
	• RF system		
	• Infrared (IR) TV/VCR remote control distribution system		
	• Wireless LAN		
	• Satellite CATV/DSS system		
	• X-10 power line carrier (PLC) system		

MODULE 33306-04 – CABLE SELECTION

Task Number	Item	Date(s)	Recorded By
1	Interpret contract documents in order to determine the requirements for a selected job.		
2	Perform a survey in order to accomplish the following:		
	• Compare the working drawings for the site against the actual building structure to identify specific locations and the work to be performed there.		
	• Confirm the installed locations of new and/or existing equipment and the routing of the related cabling.		
	• Measure the routing and length of selected cable pathways and raceways to verify measurements shown on floor plans and/or estimate takeoff sheets.		
3	Use task and labor hours data recorded on estimating forms and/or takeoff sheets for a selected job to develop a detailed schedule for accomplishing the job.		

MODULE 33307-04 – MAINTENANCE AND REPAIR

Task Number	Item	Date(s)	Recorded By
1	Use ESD control devices and techniques when handling and troubleshooting ESD-sensitive equipment or components.		
2	Use manufacturers' troubleshooting aids to identify system problem(s).		
3	Determine if a power supply is good or bad.		
4	Determine if a printed circuit board is good or bad.		
5	Isolate the cause of a computer-related problem to the hardware or software.		
6	Isolate common faults in copper and fiber-optic cable wired networks.		

MODULE 33308-04 – INTRODUCTORY SKILLS FOR THE CREW LEADER

Task Number	Item	Date(s)	Recorded By
This is a knowledge-based module; there are no performance tasks.			

MODULE 33309-04 – RACK SYSTEMS

Task Number	Item	Date(s)	Recorded By
1	Select a rack unit for a given application.		
2	Prepare a rack layout drawing.		
3	Calculate power requirements and Btu dissipation for a rack installation.		
4	Properly install electronic equipment in a rack.		
5	Assemble a rack, including lacing rails and vent fans.		

Level Four

MODULE 33401-03 – FIRE ALARM SYSTEMS

Task Number	Item	Date(s)	Recorded By
1	Draw a two-wire and four-wire initiating circuit.		
2	Install and troubleshoot a four-wire initiating device circuit.		
3	Wire either a conventional zone or a fire alarm system pull station.		
4	Troubleshoot an instructor-induced ground fault of a fire alarm system.		
5	Isolate a short circuit on a fire alarm system.		
6	Isolate an open circuit on a fire alarm.		
7	Program a system.		
8	Commission a system.		
9	Wire an RJ31-X telephone jack correctly.		
10	Complete an NFPA record of completion.		

MODULE 33402-03 – INTRUSION DETECTION SYSTEMS

Task Number	Item	Date(s)	Recorded By
1	Identify types of security sensors, notification devices, and control panels.		
2	Select the correct sensors, notification devices, and control panels for various applications.		
3	Install and wire a security system consisting of sensors, notification devices, and control panel.		
4	Program a control panel.		
5	Test a security system.		

MODULE 33403-03 – AUDIO SYSTEMS

Task Number	Item	Date(s)	Recorded By
1	Mount a speaker.		
2	Properly terminate equipment and speakers.		
3	Identify audio cable types and applications.		
4	Identify a cable bundle.		
5	Use test equipment to set up gain structure:		
	• Meter		
	• Scope		
	• Tone generator		
	• RTA		
	• SPL		
6	Read and interpret specifications and shop drawings.		
7	Perform acceptance testing.		

MODULE 33404-03 – OVERVIEW OF NURSE CALL AND SIGNALING SYSTEMS

Task Number	Item	Date(s)	Recorded By
1	Install and connect nurse call system components.		

MODULE 33405-03 – CCTV SYSTEMS

Task Number	Item	Date(s)	Recorded By
1	Select the correct lens for a given application.		
2	Synch and phase a camera.		
3	Program a CCTV system.		
4	Measure and verify video levels.		

MODULE 33406-03 – BROADBAND SYSTEMS

Task Number	Item	Date(s)	Recorded By
1	Select and install coaxial cable connectors.		
2	Select coaxial cables used for specific applications.		
3	Calculate distribution system gains and losses.		
4	Use a signal level meter (SLM) to measure signal strength and slope of a signal.		
5	Use a cable tone test set to locate a specific cable.		

MODULE 33407-03 – ACCESS CONTROL SYSTEMS

Task Number	Item	Date(s)	Recorded By
1	Install and wire a simple controller with its own or external power supply.		
2	Install and wire an electric locking device with its own or separate power supply.		
3	Install and wire an exit touch bar or switch.		
4	Install and wire an entry keypad device.		
5	Program a controller.		
6	Test the operation of the entry keypad, locking device, and exit touch bar or switch.		

MODULE 33408-03 – SYSTEMS INTEGRATION

Task Number	Item	Date(s)	Recorded By
There are no performance tasks for this module.			

MODULE 33409-03 – SYSTEM COMMISSIONING AND USER TRAINING

Task Number	Item	Date(s)	Recorded By
1	Prepare and conduct a user training session.		

MODULE 33410-03 – MEDIA MANAGEMENT SYSTEMS

Task Number	Item	Date(s)	Recorded By
There are no performance tasks for this module.			

MODULE 33411-05 – TELECOMMUNICATIONS SYSTEMS

Task Number	Item	Date(s)	Recorded By
There are no performance tasks for this module.			